church of St. Martin's priory. We see here the curious steam-carriage of the mechanician Cugnot, and the fine statue of Denis Papin by M. Aimé Millot, the bronze duplicate of which was inaugurated at Blois some weeks ago. Besides the machinery which has long been at work in this gallery, the new administration of the Conservatoire is endeavouring to show visitors all the new and interesting apparatus used in the great Parisian industries. More than 3000 visitors witness every Sunday these experiments, very beautiful and very instructive for every one. Among the most notable apparatus are those connected with electrical phenomena. The beautiful experiments of M. Gaston Planté have obtained the greatest success, as also those relating to the transmission of power to a distance by electricity. The Conservatoire is thus becoming the museum of machinery in action.

While the machinery is thus at work in the great nave, other experiments are going on in the galleries. The great electrical machine throws off sparks in the physical hall, and projections by means of the oxyhydrogen light are made elsewhere by M. Molteni. Visitors show great interest in the Echo room, the Lavoisier room, in which is a great number of instruments used by the founder of modern chemistry, the Agricultural room, where are exhibited all the newest models of agricultural machinery. It is scarcely necessary to speak of the courses of lectures by eminent professors, many of whom are known beyond France; the gratuitous courses here and at the Sorbonne for 1880-81 comprise almost every branch of pure and applied science. The public library of more than 30,000 special works is freely placed at the disposal of workers.

Among the less known departments is the public service for testing the resistance of materials, very useful to architects, contractors, and builders. Any one may take advantage of it. It is sufficient to send to the Conservatoire specimens of stone, marble, pottery, metals, tubes, &c., which are crushed, broken, or bruised by special machinery, and the results accurately registered. The most powerful of these machines is a hydraulic press of 500,000 kilograms.

Such, in few words, is the Conservatoire des Arts et Métiers. By its collections, its public courses, its library, its eminently practical services, it may be regarded as one of the most valuable institutions of France.

NOTES

THE Faraday lecture will be delivered by Prof. Helmholtz in the theatre of the Royal Institution on Tuesday, April 5. The subject will be "The Modern Development of Faraday's Conception of Electricity." The lecture will be delivered in English.

PROF. HOLDEN, of the U.S. Naval Observatory, Washington, has published, through Scribner, a biography of Sir William Herschel. Prof. Holden is also publishing, through the Smithsonian Institute, a subject index and synopsis of the scientific writings of the great astronomer.

THE Kent's Cavern Committee, when presenting their *final* Report in August last to the British Association stated that, from the first day of the exploration in 1865 to its close in 1880, George Smerdon had been continually engaged on the work, and for nearly thirteen years had been the foreman; that during that period he had always discharged his duties in a most exemplary manner, and without the least misunderstanding with the superintendents; that he was nearly sixty years of age, and so crippled with chronic rheumatism—induced by working for so many years in the damp Cavern—as to be incapable of any ordinary labour, and that it was proposed to raise by subscription a fund sufficient to secure him a small annuity. The proposal was cordially received, and Mr. Pengelly was encouraged to carry it into effect. Several contributions have already been received from Mr. G. Busk, Prof. W. B. Dawkins, Dr. John Evans, Mr. J. E. Lee, Sir John Lubbock, Bart., M.P., F.R.S., Mr. W. Pengelly, Mr. E. Vivian, M.A., and others. Further contributions to the "Smerdon Testimonial Fund" may be paid directly to Mr. W. Pengelly, Lamorna, Torquay, or to Messrs. Vivian, Kitson, and Co., Bankers, Torquay.

A MARBLE statue of Nicephore Nièpce, the inventor of photography, is now being executed by the celebrated sculptor, M. Guillaume of Paris, and will be erected and unveiled in May next at Châlons-sur-Saône.

PROF. MASKA of Neutitschein writes that the excavations now going on in the Schipka Cave, near Stramberg (Moravia), have yielded some interesting results. Among the numerous remains of Post-Tertiary animals (such as mammoth, rhinoceros, urochs, horse, lion, hyæna) the jaw-bone of a supposed diluvial human being has been found. It was imbedded in the immediate vicinity of a place where carbonised animal bones, stone implements, and bone utensils were found. The jaw-bone, described as having belonged to a child of some eight years of age (according to the development of the teeth), is of very large, indeed of colossal dimensions.

THE director of French Lighthouses has sent to the Minister of Public Works a communication recommending the lighting, by electricity, of all the great lighthouses on the French coasts. It will involve an expenditure of several millions of francs, which will end in a large economy and an extension of the range of illumination. A system of steam-trumpets is also to be established in connection with these improved lighthouses.

WITH the January number the *Quarterly Journal of Microscopical Science* enters on the twenty-first volume of its second series. First published in 1853, under the editorship of Dr. Edwin Lankester and Mr. George Busk, it now appears under the editorship of Prof. E. Ray Lankester, assisted by Mr. F. M. Balfour, Mr. W. T. Thiselton Dyer, and Dr. E. Klein. Mr. William Archer has withdrawn from the editorial staff.

THE minutes of the *Proceedings* of the Dublin Microscopical Club, which since 1865 have been published in the *Quarterly Magazine of Microscopical Science*, will for the future, we understand, be published in the *Annals and Magazine of Natural History*.

WE understand that Mr. Richard Anderson, the author of the well-known work on Lightning Conductors, has nearly ready for publication a treatise—based on the "Instruction sur les Paratonnerres adoptée par l'Académie des Sciences" of France—to be entitled "Information about Lightning Conductors."

AT its last session the French Parliament voted a grant of several millions of francs for the completion of an underground system of telegraphic wires connecting the principal cities with Paris.

SEVERAL electric railways are to be tried on the occasion of the forthcoming Electrical Exhibition at Paris. The most important will be built by Siemens Brothers, and will form consequently a prominent part of the British display. At the last sitting of the General Council of the Exhibition M. Georges Berger announced that a steam-engine of 800 horse-power will be arranged for the working of the electric light, and the number of lamps in operation is estimated at 600. A number of these will be in the large hall, but a large proportion in the gardens, in the *annexe*, and in a series of saloons fitted up magnificently with tapestry-work by the Government. The *annexe* is to be the Pavillon de la Ville de Paris, which was one of the wonders of the 1878 Exhibition, and will be transported to the vicinity of the Palais de Champs Elysées.

IN connection with our recent note on the Young Men's Home Education Society, a lady in Cork sends us some information concerning the Minerva Club, whose head-quarters seem to be in that city, and which aims at enabling ladies to educate themselves at home. The regulations of the Club seem well adapted for this purpose, and the programme includes natural science. The books recommended are all standard ones, and the examiners men of good standing in literature and science. The specimens of the examination papers sent us in geology and geography show that a high standard is aimed at. The honorary secretary of the Club is Mrs. W. S. Green, The Rectory, Carrigaline, Co. Cork.

IN the course of dredging operations in the bed of the Limmat, at Zurich, some very interesting objects have been brought to light, among others ancient coins (including fifty gold pieces of Brabant), swords, and the skeleton of a stag of a species now extinct in Switzerland. The piers of a Roman bridge which once spanned the river have also been laid bare. All the finds are being placed in the Zurich Historical Museum.

A REPORT has reached Vienna, January 24, which has not yet been confirmed, of a fresh earthquake at Agram, attended with disastrous consequences. At Landeck (Tyrol) three shocks were noticed on January 10, at 9 p.m. The first one was the most violent, and the other two followed at intervals of five minutes. The earthquake which was felt at 5.15 p.m. on December 25, in Southern Russia, extended as far as Odessa and Kishineff in south-west, Tiraspol, Byeltzy, in Bessarabia, and the Ouman district of the province of Kieff in north-east; it was strong enough in the villages Leghezino and Vishnepolie of this district. At Molokishi, district of Balta, and at Byetzy, it was very strong.

A METEORIC stone fell at Wiener Neustadt a few days ago, near the telegraph office, and penetrated deeply into the gravel-covered road. The phenomenon was witnessed by several persons, who all declare that the meteor showed a brilliant light. Upon inspection a triangular hole was discovered of 5 centimetres width; the ground was frozen at the time. The meteoric stone was excavated in the presence of Dr. Schober, director of the Wiener Neustadt High School. It weighs 375 grammes, is triangular in shape, its exterior is crystalline, with curious blackish, greyish, and yellow-reddish patches. Here and there metallic parts give a brilliant lustre. Its specific weight is very high, its hardness about 9. An analysis is now being made.

THE second series of Evening Lectures delivered at the Royal College of Science, Dublin, has commenced with satisfactory entries. The classes have been voluntarily undertaken by the professors in order to afford a systematic course of study available to beginners and to those who are earning their livelihood in various avocations during the day. Artisans and others receiving weekly wages are admitted at half fees. The courses consist of from fifteen to twenty lectures in each of the following subjects: Biology, Dr. McNab; Physical Geography, Prof. O'Reilly; Geology and Mineralogy, Profs. Hull and O'Reilly; Chemistry, Prof. Hartley; Physics, Prof. Barrett; and Mathematics, Mr. Stewart, the Demonstrator in Physics. During the session of 1879-80 the numbers in attendance at the various classes were 336. In order to give assistance needful for the continuance of this course of instruction the Worshipful Company of Drapers have generously voted the sum of 100*l.* per annum for a period of three years. The earnestness, intelligence, and regularity of those attending the evening classes is remarkable, giving evidence of a hearty desire for sound and solid scientific instruction in Ireland, as well for the love of knowledge itself as for the purposes of technical information.

NEWS from Cairo states that to the north of Memphis, near Saggarah, two pyramids have been discovered which were constructed by kings of the sixth dynasty, and the rooms and passages of which are covered with thousands of inscriptions. The discovery is said to be of the greatest scientific importance.

THE Prefect of the Seine has opened in Paris a public laboratory for the analysis of any substance used for food; the fees are very moderate, and vary from 5 francs to 20 francs, according to the difficulty in the determinations.

A MEDICAL gymnasium was opened on January 22 at Paris. It has been built in the Chausée d'Antin at an expense of 20,000*l.*, by a public company. About seventy mechanical contrivances of different descriptions have been arranged in a series of rooms. The greater number of these are worked by a steam-engine, and all of them can be graduated by screws, so that the extent, duration, and velocity of motion can be regulated according to the direction of the physicians.

THE electric steamer *Pouyer-Quertier*, belonging to MM. Siemens Brothers, has arrived at Havre, after having successfully repaired the French cable, which had been discovered to be faulty.

IN his last report to the Foreign Office H.M.'s Consul at Shanghai points out that the Chinese are much more disposed to allow the opening of coal-mines than the construction of railways. Without referring to the work being done in Formosa, he mentions that operations are in progress under English engineers for the opening of coal-pits at Kaiping, near Tientsin, and near Nganking, the capital of the Nganhwuy province. Both districts have plenty of coal, but unfortunately no navigable waterway, and for this reason the engineer of the Nganking coal-mines intends to remove to another locality near by, where there is an equal quantity of coal and better water-power. At Kaiping matters are worse, for the nearest navigable stream is at Lutai, forty miles away. To reach this it is expected that a railway may be constructed, but, as it can hardly be a commercial success, it would not much promote the cause of railway enterprise in general. The engineers find no difficulty at Kaiping in obtaining Chinese labour, but the English workmen sent there have not given satisfaction, and the Chinese are getting rid of them.

M. MAGITOT, a member of the Prehistoric Congress which met at Lisbon last autumn, reports on a Portuguese Pompeii, which he had occasion to inspect while on a tour to the territory of Tertiary Silex at Otta. The place is called Santarem and Citania. The latter is the general Portuguese name for ruins of ancient towns, which cover entire hills in the neighbourhood of Braga. The most important of these very old town-ruins is the Citania di Briteiros, which occupies nearly a kilometre square, and is supposed to be of Celtic origin. Circular walls, streets, squares, large architectural monuments, and even a number of houses have retained their typical forms. For twenty centuries this Citania was buried below *débris*, soil, and a rich vegetation; only a few years ago a zealous archæologist, Senhor Sarmento, succeeded, by costly and troublesome efforts, in clearing away the covering of centuries and to lay open to the world an ancient city in which quite a primitive state of civilisation is apparent. Its architecture and plastic ornamentation point to a somewhat advanced state of art and industry. Many stone monuments are covered with sculptures and inscriptions, which in their general character recall those of India and China, which the well-known Lyons archæologist, M. Guimet, declares to be of a symbolic and religious character, similar to those found upon the oriental monuments. It is possible that this fact might be adduced as a proof that the tribes who built these Citanias had originally emigrated from Turan.

NEWS from Washington territory states that the volcano Mount Baker was in full eruption quite recently

WE have received the first number of the *Revista* of the Society of Instruction of Oporto. There are various papers bearing on education, and one by Mr. E. J. Johnston on the Phanerogamous Flora of Oporto. The number of English names on the list of this Society is remarkable; the first name among the Foundation Members is that of Isaac Newton, followed by W. C. and A. W. Tait; there are several Allens, a Johnston, several Kendalls and Coverleys, F. C. Rawes, Henrique Rumsey, a Grant, a Hastings, and an Archer. This no doubt indicates the close commercial relations between Oporto and England.

IT is known that Leverrier, urged by growing infirmities and apprehending that he would not live to accomplish his great work on the theory of Saturn, left a part of his calculations uncompleted, convinced that this would exert no real influence on the total result. But M. Gaillot, the director of the Calculation Service of the Paris Observatory, felt it a duty to fill up the gap left by the late director of the observatory and to revise the whole of his work. We are happy to state that, as far as the revision has gone, the accuracy of the conclusions published by the great astronomer is demonstrated, and none of the neglected terms will exert any appreciable influence.

WE take the following from the *Albury Banner* (New South Wales):—It has long been a matter of popular belief that the great kingfisher was an enemy of the snake, perpetually warring upon the tribe in general, and never happier than when dining on serpent *au naturel*. It is not often, however, that even persons habitually residing in the bush have so good an opportunity as that afforded a few days since to Mr. Christian Westendorff of Jindera, for observing the laughing jackass when in the act of bagging the game referred to. Mr. Westendorff was engaged with another man in clearing some land, and in the course of the day's operations it became necessary to shift a large log. For this purpose levers were applied to each end, and after some straining the log was rolled from its resting-place. The very moment it commenced to move a laughing jackass, which had hitherto been taking a deep but unobtrusive interest in the proceedings, made a swoop down from the limb of an adjacent tree, and seized a large snake which had been lying under the log. The snake was gripped by the back of the neck (if snakes can be said to have necks) and borne away to the bird's previous perch, where the unfortunate reptile was banged against the bough until the body separated from the head and fell to the ground. The jackass then dropped the head, and seizing the body sailed away in triumph with his prize. Whether the bird had seen the snake go under the log and was watching for it to come forth again, or whether it knew by instinct that the reptile was there, is a question that may be left for naturalists to determine; but we are credibly informed that as soon as the log was shifted, and before Mr. Westendorff or his companion had any idea of a snake being in their neighbourhood, the jackass was down and had made good his seizure.

THE Russian Technical Society has created a special branch which will devote its attention to aëronautics, especially to the popularisation of all branches of aëronautics, to recent researches on this field, to the meteorology of the higher regions of the atmosphere, and to the study of the applications of aërostatics to military purposes.

WE note from the *Deutsche Industrie-Zeitung* that during 1879 some 140 tons of amber were obtained at the coast of the Baltic, of which the mine at Palmnicken yielded seventy-five tons, and the digging-engine at Schwarzort the remainder. About fifteen tons were gathered by nets and picked up on the shore. Some 3000 people (including women and children) gain their living by gathering amber.

AT the end of 1880 the Berlin Electro-technical Union numbered no less than 1575 members, 1246 of whom are foreigners.

A NUMBER of Celtic tombs were recently discovered near Lichtenwald, on the frontier between Styria and Carniola, not far from Cilli. Several of them were opened, and numerous urns were found in them. A few objects of more interest have been sent to the local museum at Cilli.

THE well-known Hungarian archæologist, Herr Wilhelm Lipp, continues the excavations of the ancient burial-ground discovered by him at Kessthely. The cost is borne by the Budapest Archæological Society. These tombs are rich in bronze and iron objects dating from the fourth and fifth centuries.

OUR ASTRONOMICAL COLUMN

BRORSEN'S COMET IN 1842.—In September, 1846, it was pointed out by Mr. Hind (*Astron. Nach.* No. 582) that the comet of short-period discovered by Brorsen at Kiel on February 26 preceding must have approached very near to the planet Jupiter about May 20, 1842, possibly within 0·05 of the earth's mean distance, and it was surmised that an entire change of orbit might have been produced at that time. In 1857 D'Arrest examined this point more closely, applying the formulæ of the *Mécanique Céleste* to determine the elements prior to the encounter with the planet. His results were published in *Astron. Nach.* No. 1087. Adopting good elements for 1846, but without taking account of perturbations, since the comet left the sphere of activity of Jupiter after the near approach, he inferred that the closest proximity occurred May 20·6924 Berlin mean time, the distance between the two bodies being then 0·05112; that for April 19·5 the inclination of the comet's orbit was 40° 51′, or 10° greater than in 1846, and that the perihelion distance was greater than 1·5, instead of 0·65 at the time of Brorsen's discovery, and it was considered that the comet would not be visible when the radius-vector was much over unity; hence, perhaps, our ignorance of its existence before the year 1846. Thus the question has remained until within the last two years. Our object now is to record the results of a much more complete investigation of the effect of the comet's encounter with Jupiter, by Herr Harzer, forming the subject of an inaugural dissertation in the University of Leipsic in 1878. He adopts the definitive elements of Prof. Bruhns for 1846, with a small correction to the mean motion indicated by the observations at the comet's reappearance in 1868, and calculates backward with great care the perturbations of Mercury, Venus, the Earth, Mars, Jupiter, and Saturn to 1842, July 16·5, when the distance from Jupiter was 0·305; the total perturbations in the interval 1846, February 25·5—1842, July 16·5 are as follows:—Mean anomaly, − 1° 58′ 32″·6; mean sidereal motion, + 4″·391; longitude of perihelion, + 9′ 52″·8; ascending node, + 24′ 35″·4; inclination, + 1° 48′ 31″·4; angle of eccentricity, + 56′ 30″·0. From the ecliptical co ordinates of the comet with respect to Jupiter at the latter date and the variations of these relative co-ordinates, the hyperbolic elements of the orbit about the planet are obtained and the perijove is found to have taken place May 27·28488 M.T. at Berlin, when the distance was 0·054714. The hyperbolic elements are assumed to 1842, April 7·5, when the distance between comet and planet was 0·30334, and the radius of the sphere of attraction 0·27149. The elements are then again referred to the sun, and thus the following figures defining the comet's orbit before this near approach to Jupiter, result:—

Epoch, 1842, April 7·5 Berlin M.T.

Mean anomaly	135° 0′ 58″·0	
Longitude of perihelion	111 50 20·6	1846·0
,, ,, ascending node ...	103 42 12·8	
Inclination...	46 18 57·4	
Angle of eccentricity	49 32 10·0	
Mean daily motion	686″·253	
Log. semi axis major	0·4756809	
Perihelion distance	0·7151810	

The only very striking difference from D'Arrest's figures, which were confessedly a rough approximation, is in the perihelion